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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,303	11/08/2001	Masakatsu Ota	00684.003281	5183

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EXAMINER

ESPLIN, DAVID B

ART UNIT	PAPER NUMBER
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2851

DATE MAILED: 11/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/986,303	Applicant(s) OTA ET AL.	
	Examiner D. Ben Esplin	Art Unit 2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6, 7, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,922,290 to Yoshitake et al. in view of European Patent Application 0 820 132 to Ohmi et al., and in further view of U.S. Patent No. 6,442,181 to Oliver et al.

FIG. 1 of Yoshitake shows a projection exposure apparatus that includes an illumination optical system (excimer laser 1) for illuminating a pattern of a reticle (reticle 5) with laser light, a projection optical system (reduction lens 6) for projecting the illuminated pattern onto a substrate (wafer 7) and adjusting means for adjusting an optical characteristic of the projection optical system in accordance with a change in wavelength of the laser light. The adjusting means of Yoshitake is shown, in FIG. 1, as a detecting means (wavelength measuring instrument 3) for detecting the wavelength of the laser light, and a correcting means of moving both the reticle and the wafer in the optical axis direction of the projection optical system.

Yoshitake does show that the illumination optical system should be a KrF excimer laser. However, Yoshitake does not teach whether the laser to be used should be a continuous or pulsed emission type excimer laser. Ohmi discloses an excimer laser oscillation apparatus, with a wavelength stabilization means, for a continuous emission excimer laser of the KrF, ArF, and F₂ types (page 2 lines 7 and 8) for use in apparatuses like the projection exposure apparatus of

Yoshitake (page 4 line 42). Therefore, it would have been obvious to include a continuous emission excimer laser in the illumination optical system of the projection exposure apparatus of Yoshitake as an art recognized specific embodiment of the generic excimer laser shown. The use of ArF and F₂ types of lasers would inherently lead to the wavelength restrictions of claims 6 and 7.

The wavelength stabilizing means for the continuous emission excimer laser of Ohmi does not suggest the use of a piezoelectric device. But Oliver teaches that using piezoelectric devices for stabilizing the wavelength of an excimer laser was well known as an alternative to traditional stabilizing systems, and that piezoelectric devices provide extremely fast response to wavelength instability (col. 21 lines 48-65). So it would have been obvious to replace the wavelength stabilizing means of Ohmi, in the projection apparatus of Yoshitake in view of Ohmi, with a wavelength stabilizing means including a piezoelectric device in order to make the wavelength stabilizing means faster in responding to wavelength instability.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshitake in view of Ohmi, and in further view of Oliver as applied to claims 1-4, 6, 7, and 11 above, and still further in view of U.S. Patent No. 5,920,398 to Iwanaga et al.

Yoshitake and Ohmi are silent concerning driving means for scanningly moving the reticle and the substrate in order to illuminate the reticle with slit-like light. Iwanaga discloses an exposure apparatus that includes a reticle stage 3 and a wafer stage 5 in order to facilitate the reticle and the substrate being scanned with respect to each other, allowing the reticle to be exposed with slit-like light (col. 5 lines 21+), increasing the surface area of patterns that may be

exposed onto the substrate from the reticle. In view of the teachings of Iwanaga it would have been obvious to include a reticle stage and wafer stage capable of relative scanning motion in the apparatus of Yoshitake in view of Ohmi, and accordingly using slit-like exposure light to expose the pattern of the reticle, in order to increase the potential surface area of the patterns to be exposed.

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshitake in view of Ohmi, and in further view of Oliver as applied to claims 1-4, 6, 7, and 11 above, and still further in view of U.S. Patent No. 5,170,207 to Tezuka et al.

Neither Yoshitake nor Ohmi teaches of a specific projection optical system lens design and composition, although Yoshitake does include a generic projection optical system (reduction lens 6). Tezuka shows in FIG. 3 a projection optical system that includes a lens system made up of more than ten lens elements. The system of Tezuka is designed to optimize exposures during lithographic processes made with short wavelength lasers (see abstract). Further, it is disclosed that the lenses of the system of Tezuka should be made with SiO_2 or CaF_2 (col. 1 lines 40-44). In view of the teachings of Tezuka, it would have been obvious to include the projection optical system of Tezuka in the apparatus of Yoshitake in view of Ohmi in place of the reduction lens 6, in order to optimize the exposures performed with the short wavelength lasers of the illumination optical system.

Response to Arguments

Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to D. Ben Esplin whose telephone number is (703) 305-4022. The examiner can normally be reached on Mon.-Fri. (8am-4:30 pm).


Application/Control Number: 09/986,303
Art Unit: 2851

Page 6

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russell E. Adams can be reached on (703) 308-2847. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


DBE


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